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Follow-up evaluation of first two cohorts of graduates of the Zambian HIV nurse practitioner program

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ABSTRACT

Background: This paper presents findings from a follow-up evaluation of the 63 graduates of the first two cohorts of an HIV Nurse Practitioner (HNP) program that was initiated in Zambia in 2009.
Methods: This was a descriptive study that incorporated a mixture of quantitative and qualitative data collection methods. A structured interview guide was used to collect data during structured interviews with 40 of the 63 graduates of the HNP program, 39 of their supervisors, and 49 of their patients. In addition 566 charts were audited to assess the quality of care provided by the graduates.
Results: Findings indicate that the graduates were assuming the expanded roles for which they were prepared, and many were working in other units in addition to the ART clinic. Patients reported a high level of satisfaction with the quality of care provided by the graduates, and reported that the graduates were providing quality care. The data from the chart audits indicated that although the graduates are generally documenting and providing care appropriately, there are areas that should be improved and emphasized in refresher courses and in the future HNP educational programs.
Conclusions: Findings are consistent with findings from the limited number of other published studies suggesting that nurses can provide high-quality care for patients with HIV and AIDS. Further research is recommended to assess the impact of such programs on morbidity and mortality indicators, and on staff retention and job satisfaction of nurses and also of the HNPs.

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1. Introduction

Zambia has a population of 14.6 million people, with a mean life expectancy of 52.7 years. Nearly 1,106,000 are currently living with HIV and AIDS (Central Intelligence Agency. The World Factbook – Zamba., 2014). Most, if not all, of those infected with the virus are ultimately expected to develop AIDS, a condition associated with an extremely high case fatality rate, unless successful interventions such as the uptake of Highly Active Antiretro-

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viral Therapy (HAART) are promoted. HAART has been shown to improve the quality of life for people living with HIV and AIDS (World Health Organization, 2006). Effective anti-retroviral therapy (ART) management is a strategy for the reduction of HIV transmission (Zambia Ministry of Health. Adult, 2010). Although the Government of the Republic of Zambia has established providing ART to all HIV positive clients as a priority, one of the primary barriers to achieving an effective ART program is the lack of adequate human resources for HIV counseling, testing, and treatment (President's Emergency Fund for AIDS Relief, 2011a).

It is estimated that 14% of Zambian adults age 15–49 are HIV positive (President's Emergency Fund for AIDS Relief, 2011a). This high HIV rate requires expansion of ART services which currently are inadequate. The Zambian government, in its effort to manage this number of patients and sustain the ART program, is committed to training more health workers to provide comprehensive care for patients with HIV and AIDS (Zambia Ministry of Health, 2011b). Nurses and Midwives play a significant role in the health system in Zambia, and work in all levels of the health care system. It is, therefore, critical to train nurses and midwives to provide high quality HIV services, including prescribing and managing ART therapy.

The World Health Organization (WHO) has recommended that low-resource countries use task-shifting approaches in order to address the HIV crisis (World Health Organization, 2008). Although most reports suggest positive outcomes of task-shifting (Callaghan, Ford, & Schneider, 2010; Emdin, Chong, & Millson, 2013; Fairall et al., 2012; Iwu & Holzemer, 2014; Lehmann, Van Damme, Barten, & Sanders, 2009), there have been a few reports suggesting that without sufficient training, task-shifting may have negative outcomes. For example, Brentlinger et al. (2010) observed 127 patient encounters by medical technicians who had participated in a two-week inservice training course about ART in Mozambique, and reported that only 37.6% assigned the correct WHO clinical stage, and only 75.5% correctly managed ART prescriptions. In contrast, a retrospective study comparing patient outcomes (such as adherence rates, reporting of CD4 cell counts, after initiating ART, and rate of loss to follow up) in Mozambique showed that the quality of HIV care was comparable between non-physician clinicians (NPC) and physicians (Sherr et al., 2010). The authors of this study did not describe the type of training provided for the NPCs, and also did not directly observe the care provided by the NPCs. The experience from Rwanda in a pilot task-shifting program suggested that when given adequate training, mentoring and support, nurses can effectively and safely prescribe ART (Shumbusho et al., 2009). Fairall et al. (2012) conducted a cluster randomized trial in South Africa to evaluate a nurse-task shifting program and concluded that "Expansion of primary-care nurses' roles to include ART initiation and represcription can be done safely, and improve health outcomes and quality of care, but might not reduce time to ART or mortality" (p. 889). Walsh, Ndubani, Simbaya, Dicker, and Brugha (2010) evaluated the impact of task-shifting in Zambia and warned that the impact of task-shifting has been to increase workloads for health care workers, and urged mixed methods research to further examine the long term impact of task-shifting initiatives on the health care workforce. In a recently-published systematic review of articles evaluating the impact of task-shifting on the provision of HIV services, Mdege, Chindove, and Ali (2012), identified and analyzed outcomes from six effectiveness studies and reported that the findings suggested that task-shifting can save money without compromising patient outcomes. However, these authors indicated that the sample sizes in most of the studies were small, and suggested that there is a need for additional research to evaluate the effects of task shifting models. More recently, Iwu and Holzemer (2014) conducted a systematic review of 11 studies that were conducted between 2009 and 2012 related to task shifting from physicians to nurses in HIV settings. Findings from this review suggested that there were no differences in mortality rates in 7/8 studies, although five studies reported better patient retention in the nurse-managed groups. Three studies reported positive effects of the task shifting on nurses' levels of job satisfaction, although the authors noted that only two studies directly assessed nurses' perceptions of nurse managed care. Five studies reported that nurse-managed care was acceptable to patients, two reported that it was acceptable to other nurses, and one reported that it was acceptable to physicians and program managers. These authors recommended future research exploring nurses' responses and perceived self-efficacy and job satisfaction.

In 2007, under the leadership of the General Nursing Council of Zambia and in collaboration with many partners including the Zambian Ministry of Health, the University of Zambia, and numerous non-governmental organization partners, a training program was developed to prepare HIV Nurse Practitioners (HNPs). This program was finally launched in 2009 at the Lusaka Schools of Nursing and Midwifery. A description of the program and the evaluation of the first cohort of 30 students has been published previously (Msidi et al., 2011). During the initial phase, a total of 92 nurses have completed the program in three different cohorts (2009–2010; 2010–2011; and 2011–2012). The program was one year in length and included an initial six-week session offered at the Lusaka Schools of Nursing and Midwifery. This initial session included two weeks of didactic classes and four weeks of clinical mentoring in local ART health facilities. This initial session was followed by ten months in which students received 40 h of clinical mentoring per month at their clinical work sites. Students also completed two case studies monthly throughout the ten month period. Findings from the initial evaluation of the HNP program in Zambia showed that the graduates were able to achieve the identified competencies and, their supervisors perceived that the graduates would be able to utilize the acquired skills to improve the quality of care for the HIV infected patients (Msidi et al., 2011). Following the initial phase of the program, in 2012 the program coordination was transferred to the University of Zambia due to a change in program funding. Since that time an additional 62 students have completed the program.

The purpose of this paper is to present findings from a follow-up evaluation of the 63 graduates from the first two cohorts of the Zambian HNP program in order to identify perceptions of the program by graduates, their supervisors, and their clients and to identify the quality of their care as determined by data gathered from chart audits. The main objective of this evaluation is to provide information that can be used to improve the existing program in Zambia and that can be shared with other countries interested in implementing similar programs. The evaluation included interviews with the graduates, their supervisors, their patients, and also an audit of their clients' charts.

The specific study questions that guided the evaluation were as follows:

1. *What are graduates' and supervisors' perceptions of the program and recommendations for improving the program?*
2. *What are the roles being assumed by the HNP graduates and what are the challenges they face in implementing their roles?*
3. *What are graduates' and supervisors' perceptions of the graduates' level of competence in assuming the HNP role?*
4. *What are clients' perceptions of the quality of care provided by the HNP graduates?*
5. *What is the quality of care provided by HNP graduates as assessed by appropriateness of documentation reflected in the charts of patients managed by the graduates?*

2. Material and methods

A cross-sectional descriptive design was used that incorporated both quantitative and qualitative data collection methods. The study was approved by the Research Ethics Committee of the University of Zambia. The graduates, supervisors, and patients/caregivers signed informed consent documents that were translated into the local languages of participants by Zambians who were fluent in both English and the local language. Members of the HNP Program Monitoring and Evaluation (M & E) Team developed the data collection instruments. These included an interview tool for the HNP graduates; an interview tool for the immediate supervisors of the HNP graduates; an interview tool for adult patients and for caregivers of pediatric patients who were seen by the HNP graduate; and a chart audit tool. The three interview tools included questions that provided structured quantitative data (for example graduates and their supervisors were asked to rate their perceptions on a Likert scale about the extent to which graduates had achieved each of the specified program competencies, and graduates were asked to rate on a Likert scale the extent to which they believed that specific topics in the program had been adequately addressed). The tool also included a checklist asking whether or not the HNP graduate was performing specific activities in the clinic. Patients were asked to rate their level of satisfaction with the care provided by the HNP graduates. Open-ended questions were used to collect qualitative data from the graduates, supervisors, and patients. For example, patients were asked to respond to an open-ended question asking for their suggestions about how the services provided by the HNP could be improved, supervisors were asked to describe any challenges that they had experienced with integrating the HNP into the clinic, and graduates were asked to provide suggestions about how the HNP program could be improved. The chart audit tool included only quantitative data, assessing whether the graduate provided appropriate documentation in the chart of the history, review of systems, vital signs and physical assessment, and patient assessment. Copies of all data collection tools are available upon request. All data collection tools were developed in English (the Zambian official language). The patient interview tools and consent forms were translated into the seven major local languages that are most commonly spoken by patients in the clinical facilities. Although there was no assessment of reliability of the interview tools and chart audit forms, content validity of the tools and chart audit forms was assessed by the members of the M & E team, and they were pilot-tested with four of the graduates from the first two cohorts as well as with three supervisors and three patients. The data from the pilot tests were not included in the final analysis. Minor revisions to the instruments were made after the pilot testing.

2.1. Data collection procedures

Three teams that included three interviewers visited each graduate and the clinics where they were working over a 2-week period in October 2012. Two of the teams included one physician and two-three nurses, and the other team included three nurses The physicians and one of the nurses or midwives (who were HNPs) assumed responsibility for the chart audits, and the other team members conducted the interviews (with one team member conducting each interview). The same team members conducted the interviews across all of the data collection visits. All team members participated in training prior to the start of the project. Each visit took approximately five hours. The data collectors spoke the language of the participants and conducted patient interviews to complete the data collection tools in the participants' local language or in English based on the participant's preference.

2.2. Sample

The sample inclusion criteria for the HNP graduates were:

(a) one of 63 graduates from the first two cohorts of the HNP program;
(b) currently practicing in an HIV clinical site;
(c) providing informed consent to participate; and
(d) having not participated in the pilot assessment of the study instruments.

Sample inclusion criteria for the supervisors were that they were working in the ART clinic and supervising the HNP graduate, and provided informed consent to participate. Sample inclusion criteria for the patients were that they were an adult patient or pediatric patient who had been seen by the HNP graduate on the day of the visit who consented to be interviewed. The criteria for selection of charts for the chart audits were that the chart was for an adult, pediatric, or maternity patient who had been seen by the HNP graduate following his/her completion of the program. Attempts were made to sample 12 charts for each graduate.

3. Results

The final sample included 40 nurses ($n = 27$ enrolled nurses, three enrolled midwives, eight registered nurses, and two registered midwives). A total of 11 of the graduates were not available at the time of the interviews, one had died, seven were excluded because they were involved in administration and not in the HNP role that they were prepared for, and four were not included because they had participated in the pilot study.

The nurses' ages ranged from 24 to 57 years (mean 37, SD 8.4). The sample included 16 male and 24 female nurses who were working in both rural (22) and urban (18) facilities in eight of the 10 provinces in Zambia: Central (3), Copperbelt (3), Eastern (8), Luapula (4), Lusaka (8), Northern (3), North-Western (5), and Western (6). A total of 19 of the nurses had been enrolled in the 2009–2010 cohort and 21 had been enrolled in the 2010–2011 cohort. Only five of the 40 graduates had changed health facilities since they qualified as an HNP.

A total of 39 supervisors of these HNP graduates were also interviewed ($n = 19$ male and $n = 20$ females). One graduate supervisor was not at the clinic at the time of the visit and could not be reached for an interview. At the time, the graduate was the most senior person at the site. Table 1 includes information about the demographic characteristics of the supervisors.

Because interviewers sometimes visited the clinics at times when clients were not present, only 30 adult patients and 19 caregivers of pediatric patients were interviewed. The mean age of the adult patients was 37 years (SD 8.4 years). The mean age of the pediatric patients whose caregivers were interviewed was 6.7 years (SD 4.1). Tables 2 and 3 include information about the

Table 1
Demographic characteristics of supervisors.

Age range (number responding per category)	Years in service (number responding per category)	Months supervising the HNP graduate (number responding per category)
20–30 years (4)	1–5 years (7)	<6 months (3)
31–40 years (13)	6–10 years (7)	months (3)
41–50 years (14)	11–15 years (5)	>12 months (33)
Over 50 years (8)	ears (11)	
	>21 years (9)	

Table 2
Patients' educational levels and length of care by HNP graduate of adult patients.

Educational level (number responding per category)	Length of time attended by the HNP graduate at the facility (number responding per category)
Never been to school (3)	First visit (5)
In primary school (11)	<6 months (9)
Completed primary school (5)	6 months–1 year (8)
In high school (1)	1–2 years (1)
Completed high school (9)	3–5 years (7)

Table 3
Parents' and caregivers' educational levels and length of care by HNP graduate of pediatric patients and caregivers.

Educational level of caregiver (number of responses by category)	How long child has been attended by the HNP graduate at this facility (number of responses by category)
Never been to school (4)	First time (3)
In primary school (9)	<6 months (5)
Completed primary school (5)	6–12 months (4)
In high school (1)	1–2 years (5)
	3–5 years (2)

educational levels and length of time attended by the HNP graduates of the adult and pediatric patients.

A total of 566 charts were audited. The team members selected charts of patients who had been assessed and treated by the HNP graduate and attempted to assess a variety of types of patient visits. Table 4 illustrates the numbers of charts that were audited by type of patient visit.

The data from the interview data collection tools and chart audit forms were entered into an SPSS (Version 21) database. Quantitative data were analyzed using descriptive statistics and qualitative data were analyzed using thematic content analysis procedures to identify common themes in the narrative responses. This section reports the key findings related to each of the study questions.

3.1. Graduates' and supervisor's perceptions of the program

Graduates were asked to rate the extent to which 20 of the main topics addressed in the HNP program had been covered well using a 4-point Likert scale. In general, graduates perceived that all of the topics had been addressed well or very well, although there were six topics that were rated by 10% or more of the respondents as "covered somewhat", suggesting that these topics might need to be strengthened in future program offerings. These topics included pharmacology, pediatric HIV, psychosocial issues, managing opportunistic infections, creating community linkages, and history/physical exam. Nineteen of the 40 graduates (47.5%) perceived that the two-week didactic component had been sufficient, but 21/40 (52.5%) perceived that additional time was needed to adequately cover the program content. Graduates perceived the didactic classes, clinical mentoring, and the case studies as useful or very useful teaching strategies. All of the graduates indicated that they felt well prepared to provide antiretroviral therapy (ART) services. A total of 33/40 (82.5%) indicated that they received mentorship and supervision, but 6/40 graduates (15%) indicated that they did not receive any mentorship. The few recommendations that were made about improving the program (and numbers of respondents who made the recommendations) included: training more HNPs (13/40 graduates (32.5%) and 9/39 supervisors (23%)), providing ongoing mentorship (4/40 or 10% of graduates), providing refresher courses (1/40 or 2.5% of graduates and 5/39 or 12.8% of supervisors), extending the program length (11/40 or 27.5% of graduates), providing Ministry of Health recognition for the HNP role (8/40 or 20% of graduates and 7/39 or 18% of supervisors), and increasing HNP salaries (4/39 or 10% of supervisors).

3.2. Graduates' roles and challenges

Table 5 presents the responses from graduates and supervisors about the roles assumed by the graduates in the clinical facilities. There was general agreement in responses from graduates and supervisors. A total of 17/40 graduates (42.5%) indicated that they assumed responsibility in charge of their facilities. Interestingly, only 4/40 (10%) of the graduates indicated that they had a job description for their position as an HNP. A total of 31/40 (77.5%) of the graduates perceived that their co-workers appreciated and accepted their role as HNP, although 3/40 (7.5%) perceived that they were not well accepted, and 3/40 (7.5%) indicated that the response of their co-workers was mixed. The number of patients managed by the graduates each day in the ART clinic ranged from 2 to 200, with a mean of 42.9 (SD 33.3). All 39 supervisors responded "yes" to the question about whether the HNP was relevant to the ART program in the facility, and 38 of the 39 (97.4%) said they felt that more HNPs are required in the facility to help ease the workload. These findings indicate that the graduates are making a significant contribution to providing care for patients with HIV and AIDS, and that they are assuming the expanded roles for which they were prepared, although most did not have a specific job description for their expanded roles.

In addition to their roles in providing care in the HIV clinics, most of the graduates were also working in other units (see Table 6).

Supervisors identified a number of challenges facing the HNPs as they implemented their roles (see Table 7). These data suggest that excessive workload, lack of specific recognition of the role by the employer, and problems with implementing multiple roles were major challenges. Although this program has been approved by the General Nursing Council and the Zambian Ministry of Health, graduates of the program do not receive any additional compensation or other recognition for implementing their expanded roles.

3.3. Graduates' and supervisors' perceptions of competency of the HNP graduates

Graduates and supervisors were also asked to rate the graduates on each of the competencies that were included as expected outcomes of the program, using a 4-point Likert scale with 1 = not at all, 2 = barely 3 = well, and 4 = very well (see Table 8).

Table 4
Number and percent of charts audited by type of patient visit.

Type of visit	Adult patient – number (percent)	Pregnant patient – number (percent)	Pediatric patient – number (percent)	Total – number (percent)
Initial visit	82 (14.5)	42 (7.4)	40 (7.1)	164 (29)
Assessment for ART eligibility	57 (10.1)	26 (4.6)	25 (4.4)	108 (19)
Short visit	42 (7.4)	23 (4.1)	18 (3.2)	83 (15)
Clinical follow-up visit	97 (17.1)	37 (6.5)	77 (13.6)	211 (37)

Table 5
Roles assumed by graduates as reported by graduates and supervisors.

Role	Responses from graduates		Responses from supervisors	
	Yes	No	Yes	No
Works as HNP	40 (100)		34 (87.2)	5 (12.8)
Undertakes counseling and testing for HIV	34 (85)	6 (15)	31 (79.5)	8 (20.5)
Undertakes treatment preparation	39 (97.5)	1 (2.5)	39 (100)	0
Undertakes initial history	40 (100)		39 (97.4)	1 (2.6)
Undertakes physical assessment	40 (100)		38 (97.4)	1 (2.6)
Undertakes adherence counseling	39 (97.5)	1 (2.5)	37 (94.9)	2 (5.1)
Undertakes clinical follow-up	40 (100)		38 (97.4)	1 (2.6)
Undertakes screening for opportunistic infections	40 (100)		38 (97.4)	1 (2.6)
Prescribes ART for stable patients	40 (100)		38 (97.4)	1 (2.6)
Undertakes collection of specimens when necessary	36 (90)	4 (10)	36 (92.3)	3 (7.7)
Stabilizes patients in emergencies	34 (85)	6 (15)	36 (92.3)	3 (7.7)
Undertakes family planning services	26 (65)	14 (35)	38 (97.4)	1 (2.6)
Undertakes general nutrition counseling	36 (90)	4 (10)	35 (89.7)	4 (10.3)
Undertakes maternal nutrition counseling	35 (87.5)	5 (12.5)	32 (82.1)	7 (17.9)
Undertakes sexual reproductive counseling	39 (97.5)	1 (2.5)	38 (97.4)	1 (2.6)
Undertakes STTI Management	40 (100)		36 (92.3)	3 (7.7)
Identifies signs of treatment failure	40 (100)		38 (97.4)	1 (2.6)
Infertility counseling and referral	32 (80)	8 (20)	23 (59)	16 (41)
Prescribes drugs for Prevention of Mother-to-Child Transmission of HIV (PMTCT)	37 (92.5)	3 (7.5)	37 (94.9)	2 (5.1)
Provides medication for opportunistic infections	38 (95)	2 (5)	37 (94.9)	2 (5.1)

Table 6
Graduates' assignments to other units in addition to HIV clinic.

Type of service	Number deployed in this service	Type of service	Number deployed in this service
Labor ward	16	Pediatric ward	14
Maternal, neonatal, and child services	18	Outpatient department	23
Medical ward	15	ART clinic	39
Surgical ward	10	Other	4

Table 7
Supervisors' perceptions of challenges confronting the HNP graduates.

Challenge	Number (percent) saying yes	Number (percent) saying no
Problems with excessive workload of HNP	33 (84.6)	6 (15.4)
Lack of recognition by employer	27 (69.2)	12 (30.8)
Problems with multiple roles expected of HNP	23 (59)	16 (41)
Problems with retention of HNP	19 (48.7)	20 (51.3)
Problems with attitudes of other cadres towards HNP	3 (7.7)	36 (92.3)
Problems with competence of HNP	2 (5.1)	37 (94.9)

In general, both graduates and supervisors perceived that graduates were demonstrating all of the competencies well or very well, as evidenced by mean scores on all competencies ranging from 3.2 to 4.0 on a 4-pont Likert scale.

3.4. Patients' perceptions of quality of care provided by the HNP graduate

Table 9 presents findings from the interviews of the 30 adult patients and 19 pediatric patient caregivers who were interviewed related to their perceptions of the quality of care provided by the HNP graduate. None of the adult patients and only one of the pediatric patient caregivers indicated that they would change their provider if given the opportunity. These data indicate that the patients were extremely satisfied with the quality of care provided by the HNP graduates, and that the graduates were providing quality care to these patients.

3.5. Quality of care indicators from chart audits

A total of 566 patient charts were reviewed to assess the comprehensiveness of documentation of care provided by the HNP graduate, and also to assess whether the care provided was appropriate and consistent with Zambian Ministry of Health guidelines. Tables 10–13 present data evaluating whether the graduate provided appropriate documentation in the chart of the history, review of systems, vital signs and physical assessment, and patient assessment. Because not all of the data were appropriate for every type of clinic visit, the total numbers for some of the assessments are less than 566. Those areas in which fewer than 75% were documenting or managing appropriately are indicated by asterisks in the tables. These include documentation of history (TB screening, immunizations, and current medications); physical assessment (blood pressure, pulse, respiratory rate, and for children: head circumference and growth chart); and patient assessments (developmental assessment and side-effect toxicities). Although lack of available equipment may explain some of these problems (e.g. failure to assess blood pressure), others can be addressed without special equipment and suggest areas for continuing improvement. Attempts were made to determine the appropriateness of care based on the chart audits, however because these assessments were not validated, they are not reported here.

4. Discussion

This evaluation provided important data to assess the performance of the first two cohorts of HNPs in Zambia and to explore how they are being integrated into the Zambian health system, the quality of care they are providing, and the challenges that they face.

4.1. Summary of findings

The basic findings in response to each of the study questions are summarized below.

1. What are graduates' and supervisors' perceptions of the program and recommendations for improving the program?

In general, the graduates perceived that the major content areas of the program were covered well, although half of them perceived

Table 8
Graduates' and supervisors' ratings of graduates' competencies.

Item	Graduate's response mean (SD)[a]	Supervisor's response mean (SD)[a]
Apply knowledge of HIV in care of patients	3.9 (.3)	3.7 (.5)
Apply the chronic care model	3.7 (.4)	3.7 (.6)
Assess ART needs of patients	3.8 (.4)	3.7 (.6)
Partner with other care providers	3.5 (.5)	3.5 (.6)
Initiate and refill ARV prescriptions	4.0 (0)	3.8 (.6)
Follow established practices in prescribing ART drugs	3.9 (.2)	3.9 (.3)
Provide ongoing assessment, counseling, side-effect management, and care of patients receiving ART	3.9 (.3)	3.7 (.6)
Identify and manage complications of HAART and refer when necessary	3.8 (.4)	3.6 (.7)
Assess and treat patients in need of palliative or supportive care in consultation as needed	.8 (.4)	3.5 (.8)
Triage patients	3.9 (.2)	3.8 (.6)
Supervise ancillary staff	3.6 (.6)	3.3 (.7)
Provide leadership to multidisciplinary team	3.5 (.7)	3.3 (.6)
Provide leadership in management of clinical facilities	3.7 (.5)	3.1 (.7)
Work with others to ensure accuracy in monitoring patient outcomes	3.8 (.4)	3.7 (.6)
Serve as HIV resource for hospital and health center staff	3.8 (.5)	3.4 (.7)
Analyze clinical data as basis for clinical decision-making	3.7 (.5)	3.2 (.9)
Serve as role model to increase accessibility of HIV care and services	3.9 (.3)	3.7 (.5)

[a] Note: 1 = not at all; 2 = barely; 3 = well; 4 = very well.

Table 9
Perceptions of adult patients and caregivers of pediatric patients.

Item	Adult patient responses – number (percent)		Pediatric patient caregiver responses – number (percent)	
	Agree	Disagree	Agree	Disagree
The HNP was helpful and supportive	30 (100)	0	18 (94.7)	1 (5.3)
I was greeted by the HNP when I entered the consulting room	29 (96.7)	1 (3.3)	19 (100)	0
I feel comfortable talking to the HNP	29 (96.7)	1 (3.3)	19 (100)	0
I feel that the HNP answered my questions very well	25 (83.3)	4 (13.8)	19 (100)	0
I had adequate privacy during the consultation	30 (100)	0	17 (89.5)	1 (5.3)
I am satisfied with the amount of time the HNP spent with me (and with the child – for caregivers)	29 (96.7)	1 (3.3)	17 (89.5)	2 (10.5)
The information given to me by the HNP was helpful	29 (96.7)	1 (3.3)	19 (100)	0
The HNP addressed my fears and concerns	30 (100)	0	18 (94.7)	1 (5.3)
The HNP answered my questions fully	27 (90)	2 (6.7)	18 (94.7)	1 (5.3)
I am satisfied that the HNP provider has always given me the necessary information I needed about HIV/AIDS	28 (93.3)	2 (6.7)	16 (84.2)	3 (15.8)
The HNP helped me to identify ways of risk reduction	25 (83.3)	5 (16.7)	13 (68.4)	6 (31.6)
The HNP discussed how to live positively	27 (90)	3 (10)	14 (82.4)	3 (17.6)
The HNP discussed adherence to the (child's) treatment plan	28 (93.3)	2 (6.7)	18 (94.7)	1 (5.3)
The HNP asked about symptoms of other illnesses	26 (86.7)	4 (13.3)	16 (84.2)	3 (15.8)
The HNP asked about disclosure of the (client's) (child's) HIV status to others	23 (76.7)	7 (23.3)	15 (78.9)	4 (21.1)
The HNP explained the purpose of the drugs and potential side effects in words I could understand	23 (76.7)	6 (20)	16 (84.2)	3 (15.8)
I would recommend this service to others.	30 (100)	0	19 (100)	0
The HNP offered me advice on condom use	24 (80)	8 (20)	Not applicable	Not applicable
The HNP offered condoms to me	14 (46.7)	16 (53.3)	Not applicable	Not applicable
The HNP offered counseling on family planning	17 (56.7)	13 (43.3)	Not applicable	Not applicable

that the 2-week didactic program should be longer. Even though many graduates suggested the need for a longer program, others in Zambia have suggested that the program needs to be shorter in order to enable widespread scale up. Recommendations for improving the program included training more nurse practitioners, increasing the length of the didactic component of the program, and providing more mentoring. Based on this feedback, the two-week didactic component has now been increased to three weeks, the program has been continued with additional funding provided by the Centers for Disease Control and Prevention, and additional mentors have been trained.

The literature does not provide clear guidelines about the length of training needed for effective task-shifting programs in HIV care. Brentlinger et al. (2010) reported problems with the quality of care provided by non-physician technicians who completed a two-week training in Mozambique. It was not clear whether these technicians were nurses. In contrast, Shumbusho et al. (2009) reported positive outcomes of a task-shifting program in Rwanda in which nurses received formal training in the national treatment guidelines, followed by 10–15 days of supervised "bedside" training. After completing 50 physician-observed consultations, these nurses were allowed to consult patients independently but received weekly supervision and mentoring. Further research is needed to examine the optimal length of task-shifting training for nurses and for other health care workers.

2. What are the roles being assumed by the HNP graduates and what are the challenges they face in implementing their roles?

Findings indicate that the graduates are assuming the expanded roles for which they were prepared, and many are working in other units in addition to the ART clinic. They are making significant

Table 10
Documentation of patient history.

Patient history data	Yes		No		Total
	n	%	*n*	%	
Presenting complaint	548	96.8	18	3.2	566
TB screening	366	64.[a]	171	30.2	537
Current medications	393	69.4	173	30.6	566
Past medical history	152	96.2	6	3.8	158[b]

[a] indicates that fewer than 75% of the charts reviewed for this data, included the data.
[b] Past medical history may not have been indicated for return visits, or initiation of ART visits.

Table 11
Documentation of review of systems.

System review	Yes		No		Total[a]
	n	%	*n*	%	
Constitutional	401	97.3	11	2.7	412
Gastro-intestinal	401	97.1	12	2.9	413
Cardiovascular	401	97.3	11	2.7	412
Neurological	391	96.1	16	3.9	407
Respiratory	405	97.6	10	2.4	415
Genito – urinary	395	97.3	11	2.7	406

[a] Chart reviewers recorded these data only when they would have expected to see a system review, and such reviews may not have been indicated for every visit, thus totals are less than 566.

Table 12
Documentation of vital signs and physical assessment.

Vital sign or assessment data	Yes		No		Total[a]
	n	%	*n*	%	
Temperature	463	81.8	103	18.2	566
Blood pressure	347	61.3[b]	219	38.7	566
Pulse	381	67.3	185	32.7	566
Respiratory rate	332	58.7	234	41.3	566
Height	224	78.9	60	21.1	284
Eyes	446	97.0	14	3.0	460
Lymph nodes	430	95.6	20	4.4	450
Abdomen	385	88.1	52	11.9	437
Neurological	392	91.4	37	8.6	429
Ears/nose	419	95.0	22	5.0	441
Heart	386	90.0	43	10.0	429
Urogenital	354	82.3	76	17.7	430
Oral	426	95.3	21	4.7	447
Lungs	400	90.7	41	9.3	441

[a] Chart reviewers recorded these data only when they would have expected to see a system review, and such reviews may not have been indicated for every visit, thus totals are less than 566.
[b] Indicates that fewer than 75% of the charts reviewed for this data, included the data.

Table 13
Documentation of patient assessment.

Patient assessment indicator	Yes		No		Total[a]
	n	%	*n*	%	
WHO staging done	444	97.4	12	2.6	456
Assessment for side effects/toxicities done	152	72.4[b]	58	27.6	210
Assessment for treatment failure done	154	90.1	17	9.9	171

[a] Chart reviewers recorded these data only when they would have expected to see a system review, and such reviews may not have been indicated for every visit, thus totals are less than 566.
[b] Indicates that fewer than 75% of the charts reviewed for this data, included the data.

contributions to caring for patients with HIV and AIDS, and report seeing an average of 43 patients per day (with one nurse reporting that she sees up to 200 patients per day). All supervisors indicated that the HNP was relevant to the ART program in the facility, and 38/39 (97%) felt that more HNPs are required in the facility to help ease the workload. Although most of the graduates were receiving mentorship, 6/40 (15%) indicated that they received no mentoring, and only 4/40 (10%) reported that they had job descriptions. Eight of the graduates (20%) and 7/39 (18%) of the supervisors suggested that the program would be strengthened if the Ministry of Health provided official recognition. Although there had been initial concerns when the program was developed that other nurses and health care workers would not accept the expanded HNP role, 30/40 (75%) of the graduates perceived that others accepted their roles. Iwu and Holzemer (2014) identified two studies that reported that other nurses were supportive of the expanded roles of nurses who had been prepared in task-shifting programs. There is a need for further research to examine perceptions of key stakeholders (including other nurses and patients) about task-shifting and task-sharing initiatives.

3. What are graduates' and supervisors' perceptions of the graduates' level of competence in assuming the HNP role?

Both graduates and their supervisors reported that the graduates were demonstrating all 17 of the major program competencies well or very well, as evidenced by mean scores on all competencies ranging from 3.2 to 4.0 on a 4-pont Likert scale. (with 1 = not at all, 2 = barely 3 = well, and 4 = very well (see Table 8).

4. What are clients' perceptions of the quality of care provided by the HNP graduates?

Adult patients and caregivers of pediatric patients reported a high level of satisfaction with the quality of care provided by the graduates, and reported that the graduates were providing quality care. All indicated that they would recommend this service to others. These findings are consistent with the findings reported by Iwu and Holzemer (2014) who identified five studies reporting that patients had positive perceptions of task-shifting.

5. What is the quality of care provided by HNP graduates as assessed by appropriateness of documentation and management reflected in the charts of patients managed by the graduates?

The data from the chart audits indicated that although the graduates were generally documenting and providing care appropriately, there are areas that should be improved and emphasized in refresher courses and in the future HNP educational programs. These include documentation of history (TB screening, immunizations, and current medications); physical assessment (blood pressure, pulse, respiratory rate); and patient assessments (side-effect toxicities). These findings are consistent with reports from several systematic reviews that have reported positive outcomes of task-shifting programs in HIV care (Callaghan et al., 2010; Fairall et al., 2012; Iwu & Holzemer, 2014; Mdege, Chindove, & Ali, 2012).

4.2. Limitations

The study was limited by the fact that only 40 of the initial 63 graduates were assessed, and by the fact that there were no reliability assessments of the data collection instruments. Another limitation was that there was no assessment of the clinical outcomes of the patients cared for by the HNP graduates.

4.3. Strengths

Despite these limitations, the findings from this study will provide important information that will be shared with the Zambian Ministry of Health (MoH) so that the graduates' supervisors can address problems identified and continue to provide the supportive mentoring and supervision that is critical for the success of this task-shifting initiative. In addition, the findings will provide important direction for strengthening future programs. Another strength of the study is that the Zambian MoH collaborated with multiple global partners in developing and evaluating the training of HNPs in Zambia reflecting implementation of the eighth Millennium Development Goal. The qualified HNPs have gone further to mitigate the work over-load in ART clinics. The clients have shown that they are very appreciative of the HNPs service-provision which obviously works towards improvement in their quality of life.

5. Conclusions

Findings from this study are consistent with findings from the limited number of other published studies examining the outcomes of task-shifting programs to prepare nurses to assume expanded roles in caring for patients with HIV and AIDS (Fairall et al., 2012; Iwu & Holzemer, 2014; Mdege et al., 2012; Msidi et al., 2011; Shumbusho et al., 2009). For example, Shumbashu et al. Shumbusho et al. (2009) evaluated a program in Rwanda in which nurses were trained and received mentoring so that they could manage patients with HIV and initiate ART. Similar to the findings reported in the present study, although the Rwandan nurses were specifically assigned to attend to HIV patients, they continued to work in other clinical areas, and did not receive salary increases or other incentives for their new role under this task-shifting initiative. Shumbashu et al. reported that outcomes of patients who received care from the nurses compared favorably with other ART cohorts in sub-Saharan Africa and with those from the national ART program in Rwanda. Although we did not specifically assess patient outcomes in our study, the findings from the chart audits suggested that the Zambian HNP graduates were providing appropriate care consistent with the country's national guidelines for HIV care. Fairall et al. (2012) conducted a cluster randomized trial in South Africa that included 8419 patients in an intervention group who received care by specially trained nurses and 7062 in a control group who received traditional physician-led care. Similar to the program reported in the present study, nurses in the Fairrel et al. study initiated ART (and did not merely re-fill prescriptions and follow up stable patients as had been reported in many of the other evaluations of task-shifting programs). There were no significant differences in mortality rates or viral loads comparing patients in the intervention and control groups Contrary to expectations, there were no differences in time to ART initiation in the two groups. Although Fairrell et al. did not specifically assess nurses' or supervisors' perceptions of the task-shifting programs, the authors reported the findings from qualitative analyses suggested that some of the nurses were hesitant to initiate ART when it was possible to refer patients to physicians. In contrast, nurses in the present study reported feeling confident that they had achieved the program competencies and that they could provide quality care for their patients. Iwu and Holzemer (2014) recommended additional studies to explore nurses' perceptions and perceived self-efficacy for their expanded roles in task-shifting programs caring for patients with HIV and AIDS. The findings from this study provide important data regarding perceptions of nurses as well as of their supervisors and patients about the nurses' competencies as well as the impact of the HNP role on clinical services.

The findings from this evaluation suggest that the HNP program effectively prepared the graduates to provide comprehensive and high-quality care to patients with HIV and AIDS. The program is beneficial to Zambia in terms of increasing access of ART to patients. The findings from the chart audits identified areas that should be strengthened and reinforced. Although the sample for this follow-up evaluation was small, the findings suggest that the HNP program should be continued and expanded, although there is a need to ensure that the graduates receive ongoing support and supervision as they implement their new roles.

Further research is recommended to monitor the longer-term impact of such task-shifting programs on morbidity and mortality indicators, and on health system indicators including staff retention and job satisfaction of nurses and also of the HNPs.

6. Contributors

Moses Sinkala, M.D. (MS) (deceased December, 2012). Dr. Sinkala served as Medical Director for the HIV Nurse Practitioner (HNP) program since its inception. He was instrumental in providing oversight for all aspects of the program including the program evaluation.

Fastone Goma, M.D., Dean, University of Zambia School of Medicine. Dr. Goma reviewed the initial version of this manuscript and made comments. The HNP program is currently coordinated out of the University Of Zambia School Of Medicine, and Dean Goma has taken a leadership role in supporting the ongoing development and integration of this program in Zambia.

7. Conflict of interest

None.

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